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ABSTRACT

Southern College of Technology (SCT) is the only institution in the University of Georgia system to offer a developmental physics course to give students with no previous physics coursework the conceptual background and vocabulary needed to complete SCT's physics requirements. The eight sections of the developmental course focus on: (1) literal and simultaneous equations, exponents, scientific notation, graphs, and geometry; (2) right triangle trigonometry; (3) equilibrium and friction; (4) torque and rotational equilibrium; (5) uniformly accelerated motion, gravity, and free-falling bodies; (6) force and acceleration; (7) energy and momentum; and (8) rotational motion. The text and accompanying software used in the course cover the same topics as standard college physics books, but at an introductory level. Data on the achievement of former developmental studies (DS) students in subsequent college-level physics courses were gathered for summer 1986 through fall 1988. These data revealed that 62.8% of the 188 former DS students who enrolled in Physics 201, "Mechanics," earned a passing grade, compared to 58.3% of the 1,790 non-DS students. In all three trigonometry-based physics courses, former DS students had higher pass rates than non-DS students, but more non-DS students earned a grade of C or better. Of the nine former DS students who enrolled in Physics 221, the calculus-based physics course, four passed. Syllabi and information on the course textbooks are provided for all the developmental and college-level physics courses. (JMC)

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ED308909

Developmental Studies Physics: The Doors It Opens

A Paper for Presentation:

1989 NADE Conference
March 2-4, 1989
Cincinnati, Ohio

Submitted by:

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JC 890 345

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Developmental Studies Physics:
The Doors It Opens

Background:

Southern College of Technology is a special purpose four-year engineering technology college in The University System of Georgia. Enrollment is approximately 3800 students, both day and evening. There are two dormitories and an adjacent apartment complex, but the school is primarily considered a commuter school. The college is located in the Greater Atlanta area, approximately 20 miles north of Atlanta. While many of the students attending Southern Tech plan to transfer to Georgia Tech, others have attended Georgia Tech and found it too theoretical for them; hence they have transferred to Southern Tech (60 of the 447 June, 1987, graduates).

Southern Tech offers the Bachelor of Science Degree in Engineering Technology and Master of Science Degree in Technical Management and Technical Communications. The college is preparing a request to the university system's Board of Regents asking approval to grant the Bachelor of Science Degree in mathematics and in physics.

Southern Tech's entering freshmen have an overall SAT of approximately 960. An 850 (440 in mathematics and 410 in English) is required for regular admission. Approximately 1/2 of the students do not meet this requirement and, therefore enter with Developmental Studies (DS) requirements. Georgia's high schools have recently developed what is known as Quality Based Education (QBE), requiring all students to have 4 units of high school English, 2 units of HS mathematics, 2 units of HS science, and one unit of HS geometry. Students who do not meet this College Preparatory Curriculum (CPC) are required to take appropriate courses which will not count toward their hours for graduation. In mathematics, this means DS math is required, therefore DS physics; but in science, the course that fulfills their CPC requirement is Chemistry 201. This year's freshman class is the first to graduate from high school under QBE. We found very little difference in these freshmen as far as the number requiring Developmental Studies. Of the 478 entering freshmen this fall, 269 required Developmental Studies (56.2%). This compares to 229 of the 468 freshman last fall (48.9%).

As mentioned earlier, Southern Tech is a special purpose college. Our mission is, "to meet the needs of Georgia's citizens and industries for engineering technology and related instruction at the collegiate level." Because of this special purpose, we have only one level of Developmental Studies courses. Our Math 099 is an Intermediate Algebra course which is a prerequisite for Physics 097. The physics course is a mechanics course. We also have Developmental English and reading. Students requiring a more intense review of algebra, or needing to learn algebra for the first time, need to take their Developmental Studies math at one of the nearby institutions which offer two or three quarter sequences in Developmental Studies mathematics. (This accounts for a small portion of the 400 or so transfers we get each fall.)

Since all the majors offered at Southern Tech require at least two quarters of physics, and since students can graduate from high school without taking physics, even in a college preparatory curriculum, it was decided about 15 years ago to offer the developmental physics course. We are the only college in the university system to offer such a course.

In the state of Georgia, if a student has a Developmental Studies requirement(s), that student may not register for any curriculum courses without also registering for the required Developmental Studies course(s). This means that if a student has a Developmental Studies math requirement which has with it a Developmental Studies physics requirement, the student must take math the first quarter and physics the second quarter in which the student is registered (assuming fulltime status). This does not allow our students to take a trigonometry course at Southern Tech before taking our physics course. The Mathematics sequenceis as follows: Math 099, Intermediate Algebra; Math 111 College Algebra; and Math 112 Trigonometry. The best the student can do, because of Board of Regents Policy, is to take the physics concurrently with college algebra. This requires that right triangle trigonometry be taught as a part of the physics course.

The Course:

The purpose of Physics 097 is to prepare the students conceptually for Physics 201 or Physics 221. The course has been divided into eight sections. The **first section** takes about 1.5 weeks to cover. It includes a review of Literal Equations, Simultaneous Equations, Laws of Exponents, Scientific Notation, Graphs, and Geometry. Then Measurement is introduced. This includes the International System and the U.S. Customary System Units, Unit Conversion, Measures of Area and Volume, Mass and Weight and Unit Analysis. The **second section** also takes about 1.5 weeks. This is where we must teach the Right Triangle Trigonometry so that we can use this to teach vectors that will be used for the remainder of the course. We also cover Vector Addition Graphically and by the Component method, Force and Vectors, and Reslutant Force. The next seven sections take approximately one week each. They are, **third**, Equilibrium and Friction, including Newtons First and Third Laws and Friction; **fourth**, Torque and Rotational Equilibrium, with Center of Gravity; **fifth**, Uniformly Accelerated Motion, Gravity and Freely Falling Bodies; **sixth**, Force and Acceleration, Newton's Second Law with Single-Body Problems; **seventh**, Energy and Momentum, including Work and Power. The **last** chapter takes about 1.5 weeks. It is Rotational Motion. The topics in this chapter are Motion in a Circle, Centripetal Acceleration and Force, Friction, Banking of Curves, Rotation of Rigid Bodies; Angular Displacement, Velocity, and Acceleration; Relation between Angular and Linear Motion, and Rotational Work and Power.

Each of these sections comprise a testing unit, so there are eight tests. We have a test over each section since each is new material for the students and for the most part the topics build on one another. The discussion in the first section on units leads conveniently into an overview of the course. Then we talk about the difference between mass and weight. This allows the introduction of forces. Obviously in the second section the discussion on vectors does not have to be confined solely to force vectors. The problems lead nicely into free-body diagrams and equilibrium. When discussing Newton's First and Third Laws, one must hint about the *external, unbalanced force* to come along in future chapters. Finally, in a discussion of uniformly acclerated motion, students want to know why we always talk about the velocity of an object *just before it strikes the ground* and why the final velocity for freely falling objects can't be zero.

Looking over the last three sections, one can see that the sixth topic incoporates two, three and five, while the seventh builds directly on the fifth and sixth, and the last section combines torque with the previous three sections. These last sections, then serve to unify the material for the students. This is our purpose, to give the students a conceptual background for physics and to give them a working knowledge of the vocabulary. Hopefully, they can see how all the topics we have covered are interrelated and that sometimes there is more than one correct approach to a problem. The course ends with a comprehensive final. At this point they should be prepared for any mechanics course, either trig based or calculus based. Unfortunately, because they have to take our course so early in their program, it will be a minimum of two quarters before they can enroll in the trig based physics course or three quarters before they can enroll in the calculus based physics course.

Syllabi and Table of Contents for all three courses are included at the end of this paper.

Text:

The text we use is one written by the man who developed our course, Paul E. Tippens. The title of the book is *Basic Technical Physics* published by McGraw-Hill. A copy of the title page can be found in the appendix. The text is an extremely important component of the course. It covers essentially the same topics as the standard college physics books, but at an introductory level. In addition to writing the text, Paul saw the need to supplement it with software. The software parallels to text exactly. It is colorful and active. For example, if a student is studying uniformly accelerated motion, objects move on the screen to show examples of the concept. The same software is available in computer labs all over campus for use by Non-DS physics students. Many students also use our DS physics text to read for understanding of concepts they are studying in the other physics courses. We only teach the mechanics third of the physics course in our Developmental Studies physics course, but the text and software can be use for an electricity and magnetism course and for a heat, light and sound course.

Evaluation:

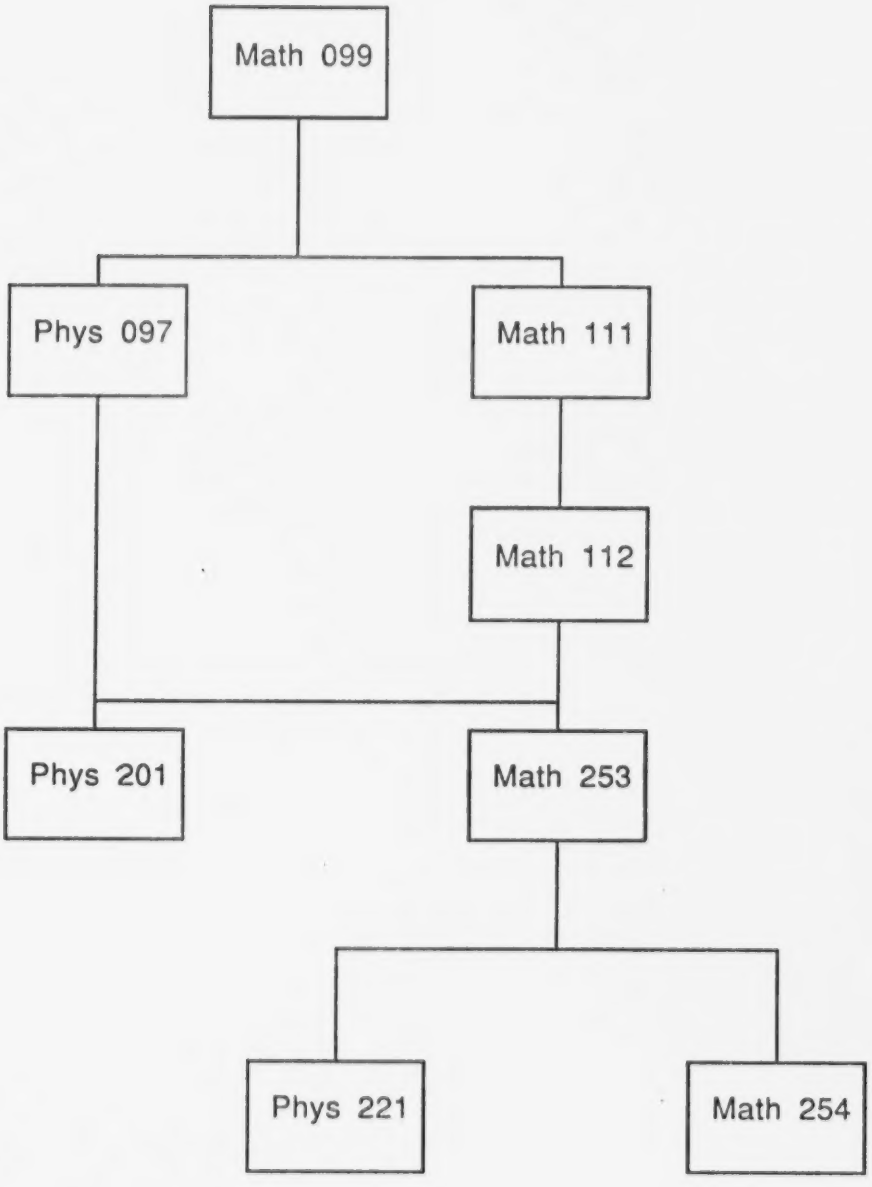
Data have been gathered for this evaluation from the Summer Quarter, 1986. At this time the Physics Department had restructured its program and changed texts, so data before that time would not be comparable. Since that time, however, 118 of the 188, or 62.8%, of the former DS Students enrolled in Physics 201 earned a passing grade, 84 of these students, or 44.7%, earned a C or better. This compares to a pass rate for Non-DS students in Physics 201 of 1043 out of 1790, or 58.3%, 4.5% lower than the rate for former DS students. However, for those students earning a C or greater, the rate of Non-DS students is 811/1790 or 45.3%, a rate 0.6% higher than former DS students.

The data for students enrolling in Physics 221, the calculus-based course is not as clear. Only 9 former DS students have enrolled in that course, so the percents reported here will be biased by the small base. Of the 9 former DS students who enrolled in Physics 221, 4 of them passed the course, or 44.4% compared to 148 out of 209 Non DS students, or 70.8%. Of the 4 former DS students, 2 or 22.2% earned a C or better. This compares to 134 of the 209 Non-DS students or 64.0%. I am not prepared to address the implications of those numbers.

There is another population of students who enroll in Physics 097. These are students who voluntarily enroll in Physics 097. These students graduated before QBE, their math SAT is higher than 440, or they transferred to Southern Tech and have not had a physics course. Many of the students come back after taking Physics 201 or 221 to tell us how well they did in the respective course. Unfortunately, they get lost in the data since they were never DS students, they just took advantage of the course to prepare them for their curriculum physics course.

The data on success rates in the three trig-based physics courses and the calculus-based physics course are attached. As can be seen, in all three trig-based physics courses, the pass rate for former DS students exceeds the pass rate for Non-DS students. Unfortunately, this is not the case for the calculus-based course, but the numbers are much too small for an accurate comparison. We are pleased with the physics course content and the job it does to prepare our students. The only change I would make would be to allow the students to take our course after they have had the trig course.

The result of our DS Physics course is to open doors in later course work, enabling a greater success rate in advanced physics courses and the multitude of courses in all of the majors at Southern Tech that have a physics foundation.


Math 099
Phys 097
Math 111
Math 112
Phys 201
Math 253
Phys 221
Math 254

PHYSICS 201

	Non-DS Students											DS Students										
	Su 86	F 86	W 87	Sp 87	Su 87	F 87	W 88	Sp 88	Su 88	F 88	Total	Su 86	F 86	W 87	Sp 87	Su 87	F 87	W 88	Sp 88	Su 88	F 88	Total
A	7	4	15	4	5	16	16	17	8	28	120	-	-	1	1	-	1	2	2	-	1	8
B	13	19	32	23	4	44	47	41	9	50	282	1	2	1	1	2	7	1	8	1	5	29
C	13	45	51	54	15	55	53	52	19	52	409	1	5	4	8	1	7	9	3	2	7	47
D	12	19	31	36	8	27	36	26	11	26	232	-	5	-	4	3	8	6	3	2	3	34
F	8	36	33	40	9	35	50	19	8	21	239	-	4	9	4	-	4	2	2	2	-	27
I	-	1	-	-	-	-	1	-	1	2	5	-	-	-	-	-	-	-	-	-	-	-
V	-	1	1	-	1	-	2	1	-	-	6	-	-	-	-	-	-	-	-	-	-	-
W	13	59	66	69	29	76	56	68	13	43	492	-	4	7	11	1	7	7	4	1	-	42
WF	-	1	1	-	-	-	1	1	-	1	5	-	-	-	-	-	-	-	-	-	1	1
Total	66	185	230	226	71	253	242	225	69	223	1790	2	20	22	29	7	34	27	22	8	17	188

Remedial Requirement: Physics

	Non-DS Students	DS Students
C or better:	45.3%	44.7%
D or better:	58.3%	62.8%
F and WF:	13.6%	14.9%
W :	27.5%	22.3%
Average Grade:	1.85	1.69

PHYSICS 202

	Non-DS Students											DS Students										
	Su 86	F 86	W 87	Sp 87	Su 87	F 87	W 88	Sp 88	Su 88	F 88	Total	Su 86	F 86	W 87	Sp 187	Su 87	F 87	W 88	Sp 88	Su 88	F 88	Total
A	14	15	5	10	3	7	12	10	4	16	96	-	-	-	1	-	1	-	-	1	-	3
B	18	17	23	19	8	25	17	27	12	43	209	-	2	-	1	-	3	3	-	-	2	11
C	25	22	31	41	17	40	39	33	13	44	305	4	1	3	3	3	2	2	3	1	7	29
D	8	15	15	3	13	12	21	16	6	18	127	-	-	-	4	1	2	2	2	-	3	14
F	4	9	12	14	5	5	8	5	2	14	78	-	-	-	-	-	1	-	1	-	1	3
I	2	-	-	-	3	-	2	1	2	-	10	-	-	-	-	-	-	1	-	-	-	1
V	-	1	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-
W	14	19	26	31	10	34	23	22	16	25	220	1	-	3	1	1	1	3	4	2	-	16
WF	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	1	2
Total	85	98	112	118	59	123	122	114	55	160	1046	5	3	6	10	5	10	12	10	4	14	79

Remedial Requirement: Physics

	Non-DS Students	DS Students
C or better:	58.3%	54.4%
D or better:	70.5%	72.2%
F and WF:	7.5%	6.3%
W :	21.0%	20.3%
Average Grade:	2.14	1.89

PHYSICS 203

	Non-DS Students											DS Students										
	Su 86	F 86	W 87	Sp 87	Su 87	F 87	W 88	Sp 88	Su88	F 88	**Total**	Su 86	F 86	W 87	Sp 87	Su 87	F 87	W 88	Sp 88	Su 88	F 88	Total
A	4	10	14	5	8	8	15	32	7	15	**118**	1	-	-	-	-	-	1	3	-	-	5
B	15	30	30	24	14	11	34	44	14	36	**252**	3	5	3	2	-	-	2	6	1	4	26
C	21	31	51	23	13	32	31	29	15	41	**287**	1	9	2	1	-	2	4	4	4	2	29
D	3	21	16	21	7	21	8	7	9	15	**128**	1	1	2	-	-	2	6	2	1	3	18
F	3	12	12	14	6	9	7	8	6	12	**89**	-	-	-	1	-	1	2	3	-	2	9
I	1	3	2	2	-	-	-	1	2	-	**11**	-	-	-	-	-	-	-	-	-	-	-
V	-	-	1	-	-	-	-	-	-	-	**1**	-	-	-	-	-	-	-	-	-	-	-
W	14	21	17	19	9	18	18	19	4	21	**160**	2	2	2	2	-	3	1	1	1	-	14
WF	-	-	-	-	-	-	-	-	-	-	**-**	-	-	-	-	-	-	2	-	-	-	2
Total	61	128	143	108	57	99	113	140	57	140	**1046**	8	17	9	6	-	8	18	19	7	11	103

Remedial Requirement: Physics

	Non-DS Students	DS Students
C or better:	62.8%	58.3%
D or better:	75.0%	75.7%
F and WF:	8.5%	10.7%
W :	15.3%	13.6%
Average Grade:	2.21	1.96

PHYSICS 221

	Non-DS Students											DS Students										
	Su 86	F 86	W 87	Sp 87	Su87	F 87	W 88	Sp 88	Su 88	F 88	**Total**	**Su 86**	F 86	W 87	**Sp 87**	Su87	F 87	W 88	Sp 88	Su 88	F 88	**Total**
A	1	4	4	3	3	4	6	7	0	3	**35**	0	0	0	0	0	0	0	0	0	0	**0**
B	5	6	3	1	5	4	6	6	0	9	**45**	0	0	0	0	0	1	0	0	0	0	**1**
C	2	8	3	3	2	10	10	9	1	6	**54**	0	0	0	0	0	1	0	0	0	0	**1**
D	0	0	3	0	0	5	2	4	0	0	**14**	0	0	0	1	0	1	0	0	0	0	**2**
F	1	3	0	1	2	5	6	3	0	2	**23**	0	0	0	0	0	0	0	1	0	0	**1**
W	1	4	4	4	6	4	4	5	0	6	**38**	0	0	0	0	1	1	0	0	0	2	**4**
Total	10	25	17	12	18	32	34	34	1	26	**209**	0	0	0	1	1	4	0	1	0	2	**9**

Remedial Requirement: Physics

	Non-DS Students	DS Students
C or better:	64.0 %	22.2%
D or better:	70.7%	44.4%
F and W:	11.0%	55.6%
Average Grade:	1.90	0.78

Southern Tech

Phys 097, Preparatory Physics
Tentative Syllabus
Quarter _____

Professor_____
Office Hours_____
OfficeNumber_____

****

Purpose: Physics 097 was developed to prepare the student conceptually for Physics 201 or 221 .

Prerequiste: Math 099 or its equivalent. A student must be able to solve simple formulas which are in the form of linear equations. Chapter 1 should be a review , not new material. See your professor if you have a question about your preparation.

Attendance: Phys 097 is a five (5) hour class which meets an equivalent of five 50 minute periods per week. Regular class attendance is essential to success in this course. Active learning in class reduces time necessary for completion of homework assignments and increases test scores. Five absences are allowed throughout the quarter; however, be warned that any absence from class jepordizes a student's grade.

Evaluation: A student's final grade in Phys 097 will be determined by performance on eight (8) tests given during the quarter, on any daily work collected, on quizzes given at the professor's discretion, and on the final exam. Each test has a value of 100 points and the final exam has a value of 200 points. Quizzes and homework will be weighted according to difficulty. The final grade will be computed as follows:

$100\% \geq A \geq 90\%$, $89\% \geq B \geq 80\%$, $79\% \geq C \geq 70\%$., less than 70% = F

Exit Requirement: In order to successfully complete the Developmental Studies Physics requirement, a student must earn at least a **C** in the Physics 097 course. Any student not meeting this requirement within two attempts will be academically dismissed.

Developmental Studies Lab: The developmental Sudies Lab is available for all Southern Tech students, but priority is given to Developmental Studies students. Student tutors are available to help students through difficult areas of study. A variety of software on the topics covered in this course is also available. The lab is staffed by a fulltime faculty member who will assist in the selection of the appropriate tutorials. In addition to the lab, help is available from faculty members during office hours.

Textbook: Tippens, Paul E. Basic Technical Physics. McGraw - Hill, 2nd edition, 1989.

Additional Materials Needed: Each student must have a calculator with Trigonometric Functions. A binder is also needed for handouts, tests, etc.

****

Outline of Topics & Tentative test Times

****

Test 1	Chapters 1 & 2	2nd Week	Test 5	Chapter 6	7th Week
Test 2	Chapter 3 & Trig	4th Week	Test 6	Chapter 7	8th Week
Test 3	Chapter 4	5th Week	Test 7	Chapter 8	9th Week
Test 4	Chapter 5 . .	6th Week	Test 8	Chapter 9	10th Week

BASIC TECHNICAL PHYSICS

SECOND EDITION

PAUL E. TIPPENS
Professor of Physics
Southern College of Technology
Marietta, Georgia

McGRAW-HILL BOOK COMPANY

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CONTENTS

Preface *ix*

CHAPTER 1 • Technical Mathematics *1*

1•1 Signed Numbers 2
1•2 Algebra Review 6
***1•3** Exponents and Radicals 10
1•4 Scientific Notation 14
1•5 Graphs 16
1•6 Geometry 19

CHAPTER 2 • Technical Measurement *28*

2•1 Physical Quantities 29
2•2 International System 30
2•3 U.S. Customary System Units 31
2•4 Measurement of Length 33
2•5 Measuring Instruments 35
2•6 Unit Conversions 36
2•7 Measurement of Area 40
2•8 Measurement of Volume 45
2•9 Mass and Weight 49
2•10 Unit Analysis 50

CHAPTER 3 • Force and Vectors *56*

3•1 Vector and Scalar Quantities 56
3•2 Addition of Vectors by Graphical Methods 59
3•3 Force and Vectors 62
3•4 Resultant Force 63
***3•5** Trigonometry 66
***3•6** Trigonometry and Vectors 73
***3•7** Component Method of Vector Addition 77

CHAPTER 4 • Equilibrium and Friction *87*

4•1 Newton's First Law 88
4•2 Newton's Third Law 88
4•3 Free-Body Diagrams 89
4•4 The First Condition for Equilibrium 90
4•5 Graphical Solution of Equilibrium Problems 91
***4•6** Solving Equilibrium Problems with Trigonometry 94
4•7 Equilibrium and Vector Components 95
4•8 Friction 98
***4•9** Limiting Angle for Friction 102
4•10 Rolling Friction 103

*Asterisk indicates optional sections and other more difficult material

CHAPTER 5 • Torque and Rotational Equilibrium *112*
- 5•1 Conditions for Equilibrium 113
- 5•2 Moment Arm 113
- 5•3 Torque 114
- 5•4 Resultant Torque 118
- 5•5 Equilibrium 120
- 5•6 Center of Gravity 123

CHAPTER 6 • Uniformly Accelerated Motion *133*
- 6•1 Speed and Velocity 134
- 6•2 Accelerated Motion 136
- 6•3 Uniformly Accelerated Motion 136
- 6•4 Other Useful Relations 139
- 6•5 Solution of Acceleration Problems 140
- 6•6 Sign Convention in Acceleration Problems 142
- 6•7 Gravity and Freely Falling Bodies 143

CHAPTER 7 • Force and Acceleration *153*
- 7•1 Newton's Second Law of Motion 154
- 7•2 Relationship between Weight and Mass 157
- 7•3 Application of Newton's Second Law to Single-Body Problems 158
- 7•4 Problem-Solving Techniques 161

CHAPTER 8 • Energy and Momentum *171*
- 8•1 Work 172
- 8•2 Resultant Work 174
- 8•3 Energy 175
- 8•4 Work and Kinetic Energy 176
- 8•5 Potential Energy 178
- 8•6 Conservation of Energy 180
- 8•7 Power 184
- 8•8 Impulse and Momentum 186
- 8•9 Law of Conservation of Momentum 189

CHAPTER 9 • Rotational Motion *199*
- 9•1 Motion in a Circle 200
- 9•2 Centripetal Acceleration 200
- 9•3 Centripetal Force 202
- 9•4 Friction and the Centripetal Force 205
- *9•5 Banking of Curves 206
- 9•6 Rotation of Rigid Bodies; Angular Displacement 207
- 9•7 Angular Velocity 210
- 9•8 Angular Acceleration 211
- 9•9 Relation between Angular and Linear Motion 213
- 9•10 Rotational Work and Power 214

COLLEGE PHYSICS

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1

UNITS, PHYSICAL QUANTITIES
AND VECTORS

1-1 Introduction 1
1-2 Standards and units 2
1-3 Unit consistency and conversions 5
1-4 Precision and significant figures 6
1-5 Estimates and orders of magnitude 8
1-6 Vectors and vector addition 9
1-7 Components of vectors 11

2

EQUILIBRIUM OF A PARTICLE

2-1 Force 17
2-2 Equilibrium. Newton's first law 21
2-3 Discussion of Newton's first law 22
2-4 Newton's third law of motion 24
2-5 Idealized models 25
2-6 Equilibrium of a particle 26
2-7 Friction 30

3

MOTION ON A STRAIGHT LINE

3-1 Average velocity 10
3-2 Instantaneous velocity 11
3-3 Average and instantaneous acceleration 13
3-4 Motion with constant acceleration 16
3-5 Freely falling bodies 50
3-6 Relative velocity 53

4

NEWTON'S SECOND LAW. GRAVITATION

4-1 Newton's second law. Mass 59
4-2 Systems of units 62
4-3 Newton's law of universal gravitation
4-4 Mass and weight 66
4-5 Applications of Newton's second law

5

MOTION IN A PLANE

5-1 Average and instantaneous velocity 82
5-2 Average and instantaneous acceleration 83
5-3 Components of acceleration 84
5-4 Projectile motion
5-5 Circular motion 93

5-6 Centripetal force 94
5-7 Motion in a vertical circle 98
5-8 Motion of a satellite 100
*5-9 The centrifuge 103
*5-10 Effect of the earth's rotation on g
5-11 Relative velocity 106

6

WORK AND ENERGY

6-1 Conservation of energy 114
6-2 Work 115
6-3 Work done byh a varying force 118
6-4 Work and kinetic energy 120
6-5 Gravitational potential energy 122
6-6 Elastic potential energy 128
6-7 Conservative and dissipative forces 132
*6-8 Internal work 133
6-9 Power 134

7

IMPULSE AND MOMENTUM

7-1 Impulse and momentum 142
7-2 Conservation of momentum 146
7-3 Collisions 148
7-4 Inelastic collisions 149
7-5 Elastic collisions 151
7-6 Recoil 154
7-7 Center of mass 156
*7-8 Rocket propulsion 158

8

EQUILIBRIUM OF A RIGID BODY

8-1 Moment of torque of a force 165
8-2 The second condition for equilibrium 166
8-3 Center of gravity 170
8-4 Couples 172

9

ROTATION

9-1 Angular velocity 179
9-2 Angular acceleration 180
9-3 Rotation with constant angular acceleration 181
9-4 Relation between angular and linear velocity
and acceleration 183
9-5 Kinetic energy of rotation. Moment of inertia 184
9-6 Torque and angular acceleration 187
9-7 Work and power in rotational motion 190

*9-8 Rotation about a moving axis 191
*9-9 Parallel-axis theorem 192
9-10 Angular momentum and angular impulse 194
9-11 Conservation of angular momentum 195
*9-12 Vector representation of angular quantities 198

10

ELASTICITY

10-1 Stress 207
10-2 Strain 210
10-3 Elasticity and plasticity 211
10-4 Elastic modulus 212
10-5 The force constant 216

11

PERIODIC MOTION

11-1 Basic concepts 220
11-2 Energy in simple harmonic motion 222
11-3 Equations of simple harmonic motion 222
11-4 Motion of a body suspended from a coil spring 228
11-5 Angular harmonic motion 230
11-6 The simple pendulum 230
*11-7 The physical pendulum

12

12-1 Density 238
12-2 Pressure in a fluid 239
12-3 Pressure gauges 242
12-4 Pumps 244
12-5 Archimedes' principle 245
*12-6 Forces against a dam 247
12-7 Surface tension
12-8 Pressure difference across a surface film 251
*12-9 Contact angle and capillary 252

13

FLUID DYNAMICS

13-1 Description of flow 259
13-2 The equation of continuity 261
13-3 Bernoulli's equation 261
13-4 Applications of Bernoulli's equation 263
13-5 Viscosity 268
13-6 Poiseuille's law 270
*13-7 Stoke's law 273
*13-8 Reynolds number 271

14

TEMPERATURE AND EXPANSION

14-1 Temperature and thermal equilibrium 280
14-2 Thermometers 282
14-3 The Celsius and Fahrenheit scales 281
14-4 The Kelvin and Rankine scales 286
14-5 Thermal expansion 288
*14-6 Thermal stresses 292

PHYS 201 - SYLLABUS - Fall '88

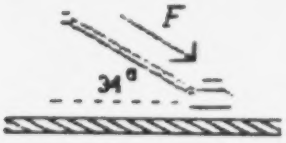
PHYS 201 MECHANICS: *An introduction to statics and dynamics. You must have passed Math 111 and Phys 099 if required.*

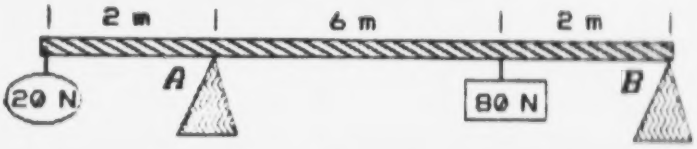
Required Materials: *(Available in the college bookstore.)*

1. Textbook: College Physics by Sears & Zemansky.
2. Physics 201 Lab Manual, an electronic calculator, "fine mesh" graph paper, and a loose-leaf filler notebook.

Optional Materials: *(Also in the College Bookstore.)*

1. Schaum's Outline for College Physics (Bueche, Author)
2. Solutions Guide for Textbook (Ford, Author)





Homework and Exam Schedule: *These problems and others assigned by your instructor are representative of those you might find on exams during the quarter.*

Chap. 1: 1, 2, 9, 37, 39, and 40
Chap. 2: 5, 11, 13, 20, 24, 26, 27, and 30

EXAM # 1

Chap. 8: 1, 4, 5, 7, 9, 12, 14, 28, 30, 34
Chap. 3: 2, 5, 10, 15, 22, 27, 38

EXAM # 2

Chap. 4: 2, 3, 4, 5, 8, 11, 18, 19, 24, 26, 29, 31, 34, and 39
Chap. 5. 4, 7, 21. 24, 25, 27, 31, 35, 36

EXAM # 3

Chap. 6: 3, 4, 5, 12, 13, 14, 19, 21, 24, 43, 52, 59, and 60
Chap. 7: 2, 7, 8, 9, 11, 13, 15, 21, 23, 35

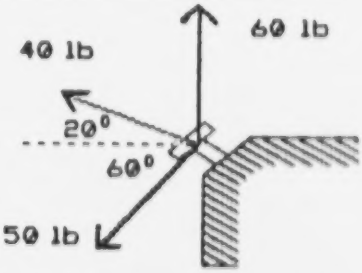
EXAM # 4

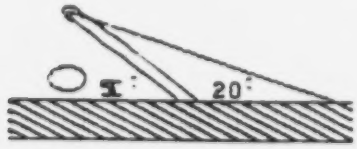
Chap. 9: 4, 8, 12, 16, 17, 23, 26, 31, 50
Chap. 10: 1, 3, and 6
Chap. 12: 1, 3, 7, 9, 10, 11, 13, 19, and 26
Chap. 13: 3, 4, 6, 11, 23, 25, and 32

EXAM # 5

DEPARTMENTAL FINAL EXAM

PHYS 201 LABORATORIES: *There are seven labs which must be completed during the quarter. The first lab meets during the second week of classes. Your lab grade is 15% of your total grade, and you must pass the lab to pass the course.*





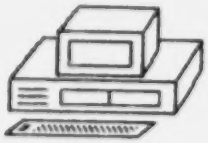
FINAL EXAMINATION: **The final exam, consisting of 25 multiple choice questions will be given at the scheduled time. It counts 25% of your total quarter grade.**

In-Class Exams: There will be five examinations given during the quarter. If all of the announced tests are taken, the lowest grade will be dropped. No make up tests are given. The average of these tests will comprise 60% of your final grade.

Homework Grade: Work outside of class is essential. At the time of each announced test, you will be asked to hand in one or two randomly selected problems from those assigned. This problems will count as additional test problems, and they will be worth 10 to 20 points toward your test grade.

Notebook: You should keep a loose-leaf filler notebook and a cheap hole punch handy for organizing your notes, problems, and returned tests. The notebook will not be checked, but it will help you to quickly locate the problems which are to be turned in at test time. The notebook can be divided into sections labeled *handouts, exams, problems, labs, and notes.* Graded exams which have not been claimed by the student within one week will be destroyed. Since returned exams are excellent for review, they should be placed in your notebook.

Computer Assisted Instruction: Tutorial modules are available in the Developmental Studies laboratory of the Academic Building. They are also available in Building 3 on weekends and after hours. You may make copies.



Library: Remember that your textbook and class notes are not the only learning resources available to you. The library has several parallel college physics texts that present alternate explanations of similar topics with new examples.

Study Habits: The key to learning physics is to organize your program of study:

1. Attend all classes.
2. Do a little work every night; don't cram.
3. Work every problem.
4. Use other resources.
5. SEEK HELP !

BUDDY SYSTEM: Find a buddy in your class and determine his or her phone number. You need a contact to verify assignments, exam times, etc.

PHYSICS 201 - WINTER 1989

Dr. Jayanti Lahiri
Office # 201 A, X 7342

Books required : 1. College Physics (Sixth Edition)
Sears, Zemansky and Young
2. Physics 201 Laboratory Manual.

Material Covered : Chapters 1-10,12,13.

Tentative Test Schedule.

Test 1	:	(Chapters 1,2)	Tuesday January 16
Test 2	:	(Chapters 3,4)	Wednesday February 1
Test 3	:	(Chapter 5)	Friday February 10
Test 4	:	(Chapters 6,7)	Friday February 24
Test 5	:	(Chapters 8,9)	Wednesday March 8

Point Distribution

5 Tests	60%
Laboratory	15%
Final Exam	25%

Regular attendance is required. Students must take all tests including the Final Exam. The final exam is comprehensive covering all the material covered from Chapter 1 to Chapter 13. Only one missed test can be made up for at the end of the quarter in a two hour comprehensive test.

A homework assignment sheet will be handed out in the beginning of the quarter. Any one particular problem from this sheet will be asked to be turned in with each test. This problem will count for 2 points.

Lab begins in the week of January 9. All students including repeaters must be registered for a lab. A minimum of 8 out of the possible 15 grade points from lab is necessary (but not sufficient of course) to pass the course.

There is no exemption from the final exam.

The last day to drop this course with a "W" is February 8.

HOME WORK ASSIGNMENT, Phys 201

Chapter 1 : 2,9,31,37,40,42

Chapter 2 : 1,3,6,9,13,16,24,27,32

Chapter 3 : 9,12,19,22,29,32

Chapter 4 : 3,5,11,21,23,35

Chapter 5 : 2,4,5,9,14,18,23,27,36

Chapter 6 : 4,9,13,14,23,30,33

Chapter 7 : 3,5,8,12,17,24,35

Chapter 8 : 2,5,9,13,18,30

Chapter 9 : 1,4,9,12,22,27,43,48

Chapter 10 : 1,3,5,17

Chapter 12 : 1,3,9,11,15,21

Chapter 13 : 2,4,8

FUNDAMENTALS OF PHYSICS

Third Edition Extended

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CONTENTS

CHAPTER 1

MEASUREMENT 1

1-1 Measuring Things 1
1-2 The International System of Units 2
1-3 Changing Units 2
1-4 Length 3
1-5 Time 4
1-6 Mass 7
Review and Summary *8*
Questions *9*
Exercises and Problems *9*

CHAPTER 2

MOTION IN A STRAIGHT LINE 12

2-1 Motion 12
2-2 Position 13
2-3 Average Velocity 13
2-4 Instantaneous Velocity 15
2-5 Acceleration 18
2-6 Constant Acceleration 19
2-7 Freely Falling Objects 21
2-8 The Particles of Physics (Optional) 24
Review and Summary *26*
Questions *27*
Exercises and Problems *28*

CHAPTER 3

VECTORS 35

3-1 Vectors and Scalars 35
3-2 Adding Vectors: Graphical Method 37
3-3 Vectors and Their Components 38
3-4 Unit Vectors 39
3-5 Adding Vectors: Component Method 40
3-6 Vectors and the Laws of Physics (Optional) 42
3-7 Multiplying Vectors 43
Review and Summary *45*
Questions *46*
Exercises and Problems *47*

ESSAY 1 **Rush-Hour Traffic Flow** E1-1

CHAPTER 4
MOTION IN A PLANE
52

4-1 Moving in Three Dimensions 52
4-2 Where is the Particle? 52
4-3 What is the Velocity of the Particle? 53
4-4 What Is the Acceleration of the Particle? 54
4-5 Projectile Motion 57
4-6 Projectile Motion Analyzed 58
4-7 Uniform Circular Motion 62
4-8 Relative Motion in One Dimension 64
4-9 Relative Motion at High Speeds (Optional) 66
4-10 Relative Motion in Two Dimensions (Optional) 67
Review and Summary *68*
Questions *69*
Exercises and Problems *71*

CHAPTER 5
FORCES AND MOTION—I
78

5-1 Why Does a Particle Change Its Velocity? 78
5-2 Newton's First Law 79
5-3 Force 80
5-4 Mass 81
5-5 Newton's Second Law 82
5-6 Newton's Third Law 84
5-7 Mass and Weight 86
5-8 Two Measuring Instruments 86
5-9 Applying Newton's Laws of Motion 87
Review and Summary *94*
Questions *95*
Exercises and Problems *97*

CHAPTER 6
FORCES AND MOTION—II
104

6-1 Friction 104
6-2 The Laws of Friction 106
6-3 The Drag Force and Terminal Speed 109
6-4 Uniform Circular Motion 111
6-5 The Forces of Nature (Optional) 115
Review and Summary *116*
Questions *118*
Exercises and Problems *119*

CHAPTER 7
WORK AND ENERGY
126

7-1 A Walk Around Newtonian Mechanics 126
7-2 Work: Motion in One Dimension with a Constant Force 127
7-3 Work: Motion in One Dimension with a Variable Force 131
7-4 Work Done by a Spring 131
7-5 Kinetic Energy 134
7-6 Power 137
7-7 Kinetic Energy at High Speeds (Optional) 138
7-8 Reference Frames (Optional) 139
Review and Summary *141*
Questions *142*
Exercises and Problems *143*

CHAPTER 8
THE CONSERVATION OF ENERGY
149

8-1 Conservation Laws 149
8-2 Potential Energy: Some Insights 149
8-3 A Close Look at Three Forces 151
8-4 Defining the Potential Energy 152
8-5 Conservative and Nonconservative Forces 156
8-6 The Potential Energy Curve 158
8-7 Nonconservative Forces 159
8-8 The Conservation of Energy 159
8-9 Mass and Energy (Optional) 162
8-10 Energy is Quantized (Optional) 164
Review and Summary *166*
Questions *167*
Exercises and Problems *168*

ESSAY 2 **Fear and Trembling at the Amusement Park** E2-1

CHAPTER 9
SYSTEMS OF PARTICLES
180

9-1 A Special Spot 180
9-2 The Center of Mass 180
9-3 Newton's Second Law for a System of Particles 184
9-4 Momentum 187
9-5 The Momentum of a System of Particles 188
9-6 Conservation of Momentum 189
9-7 Systems with Variable Mass: A Rocket (Optional) 191
9-8 Systems of Particles: Work and Energy (Optional) 193
Review and Summary *196*
Questions *197*
Exercises and Problems *198*

CHAPTER 10
COLLISIONS
205

10-1 What Is a Collision? 205
10-2 Impulse and Momentum 207
10-3 Collisions in One Dimension: Elastic 209
10-4 Collisions in One Dimension: Inelastic 212
10-5 Collisions in Two Dimensions 215
10-6 Reactions and Decay Processes (Optional) 217
Review and Summary *218*
Questions *219*
Exercises and Problems *220*

CHAPTER 11
ROTATIONAL MOTION
227

11-1 A Skater's Life 227
11-2 The Rotational Variables 227
11-3 Angular Quantities as Vectors: An Aside 230
11-4 Rotation with Constant Angular Acceleration 231
11-5 The Linear and the Angular Variables 233
11-6 Kinetic Energy of Rotation 236
11-7 Calculating the Rotational Inertia 237
11-8 Torque 241
11-9 Newton's Second Law for Rotation 242
11-10 Work, Power, and the Work-Energy Theorem 243
Review and Summary *245*
Questions *247*
Exercises and Problems *248*

CHAPTER 12
ROLLING, TORQUE, AND ANGULAR MOMENTUM
256

12-1 Discovering the Wheel 256
12-2 Rolling 257
12-3 The Yo-yo 261
12-4 Torque Revisited 263
12-5 Angular Momentum 263
12-6 Newton's Second Law in Angular Form 264
12-7 Systems of Particles 265
12-8 The Angular Momentum of a Rigid Body Rotating About a Fixed Axis 266
12-9 Conservation of Angular Momentum 267
12-10 Conservation of Angular Momentum: Some Examples 267
12-11 The Precessing Top (Optional) 272
12-12 Angular Momentum Is Quantized (Optional) 273
12-13 Conservation Laws and Symmetry: An Aside 274
Review and Summary *274*
Questions *276*
Exercises and Problems *278*

ESSAY 3 Balance **E3-1**

CHAPTER 13
EQUILIBRIUM AND ELASTICITY
284

13-1 Equilibrium 284
13-2 The Requirements for Equilibrium 285
13-3 The Force of Gravity 286

13-4 Some Examples of Static Equilibrium 287
13-5 Indeterminate Structures 292
13-6 Elasticity 293
Review and Summary *296*
Questions *297*
Exercises and Problems *298*

ESSAY 4 Dimensional Analysis and Automobile Performance: Gasoline is Stronger than Steel E4-1

CHAPTER 14
OSCILLATIONS
306

14-1 Oscillations 306
14-2 Simple Harmonic Motion 307
14-3 Simple Harmonic Motion: The Force Law 309
14-4 Simple Harmonic Motion: Energy Considerations 311
14-5 An Angular Simple Harmonic Oscillator 312
14-6 Pendulums We Have Known 313
14-7 Simple Harmonic Motion and Uniform Circular Motion 317
14-8 Damped Simple Harmonic Motion (Optional) 318
14-9 Forced Oscillations and Resonance (Optional) 320
Review and Summary *321*
Questions *322*
Exercises and Problems *323*

CHAPTER 15
GRAVITY
331

15-1 Gravity and the World Around Us 331
15-2 Newton's Law of Gravity 331
15-3 The Gravitational Constant G 333
15-4 Gravity and the Principle of Superposition 335
15-5 Proving the Shell Theorem (Optional) 335
15-6 Gravity Near the Earth's Surface 338
15-7 Gravitational Potential Energy 340
15-8 Planets and Satellites: Kepler's Laws 343
15-9 Satellites: Orbits and Energy (Optional) 346
15-10 A Closer Look at Gravity (Optional) 349
Review and Summary *351*
Questions *352*
Exercises and Problems *354*

ESSAY 5 Physics in Weightlessness E5-1

CHAPTER 16
FLUIDS
362

16-1 Fluids and the World Around Us 362
16-2 What Is a Fluid? 362
16-3 Density and Pressure 363
16-4 Fluids at Rest 365
16-5 Measuring Pressure 367
16-6 Pascal's Principle 369
16-7 Archimedes' Principle 371
16-8 Fluids in Motion 372
16-9 Streamlines and the Equation of Continuity 373
16-10 Bernoulli's Equation 375
16-11 Some Applications of Bernoulli's Equation 377
16-12 The Flow of "Real" Fluids (Optional) 379
Review and Summary *380*
Questions *381*
Exercises and Problems *382*

ESSAY 6 Physics and Sports: The Aerodynamics of Projectiles E6-1

CHAPTER 17
WAVES—I
392

17-1 Waves and Particles 392
17-2 Waves 393
17-3 Waves in a Stretched String 393
17-4 Wavelength and Frequency 394
17-5 The Speed of Traveling Waves 396
17-6 Wave Speed on a Stretched String 398

PHYSICS 221 SYLLABUS
WINTER QUARTER, 1989

TEXT: FUNDAMENTALS OF PHYSICS (3rd Edition) by Halliday and Resnick
PHYSICS 201 LABORATORY MANUAL
EUREKA SOFTWARE

Instructor - S. A. Scales Office - Room 201 Phone - 424-7215

POINT DISTRIBUTION

Best 4 of 5 Quizzes	60 %
Laboratory	15 %*
Final Exam	25%**

*Students must make a minimum of 8 points out of 15 to pass course.

**Students with an A average on all five quizzes may exempt the final.

The last day to drop the course without penalty is February 8, 1989.

COURSE OUTLINE

The course will cover selected topics from Chapters 1 thru 16. The five quizzes will cover the material in the chapters indicated below:

Quiz One	Chapters 1, 2, 3
Quiz Two	Chapters 5, 6
Quiz Three	Chapters 7, 8, 9, 10
Quiz Four	Chapters 11, 12
Quiz Five	Chapters 13, 15, 16

A detailed assignment sheet will be handed out for the material to be covered on each exam. The exam dates will be announced.

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